

Lesson 56 MEASURES

Area of rectangles: rows by columns links to multiplication

CURRICULUM ALIGNMENT

MEA.MSR.3a

compare, estimate and measure length, weight, capacity, area and volume using appropriate instruments and record and communicate appropriately.

NUM.OPS.3

understand and apply flexibly the four operations; and the relationships between operations.

INTERACTIVES Area Model · challenge, display

WHAT THIS LESSON TEACHES

To find the area of a rectangle, multiply the number of squares in a row by the number of rows. The answer is in square units, such as square centimetres (cm^2).

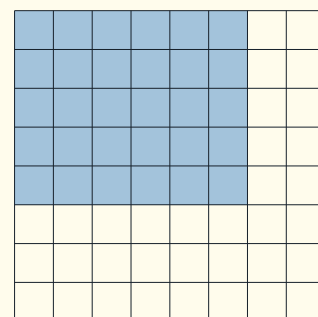
→ A 4 cm by 3 cm rectangle: $4 \times 3 = 12 \text{ cm}^2$.

→ 3 rows of 5 squares: $3 \times 5 = 15$ squares.

MODEL THIS ON THE BOARD

AREA BY ROWS × COLUMNS

- 1 The shaded rectangle has 5 equal rows of squares.
- 2 Each row has 6 squares.
- 3 Multiply rows by columns: $5 \times 6 = 30$.



DISCUSSION STARTER

REFLECT Do you prefer counting every square or multiplying rows by columns? When does each help?

LESSON ARC

Open with a 4-row, 5-column array on the IWB, top row exposed and the rest hidden under your hand — pupils guess whether they must count all 20. Work Example 1 (2×5) by counting all ten first, then revealing the multiplication so both routes land on 10 cm^2 . Try It Together steps four rectangles at the board with whole-class prediction. Pupils then draw a 5 cm by 3 cm rectangle in their copy and write $5 \times 3 = 15 \text{ cm}^2$. Class Challenge consolidates with bigger facts.

TEACHING MOVES

1. **Getting Started.** Show the 4×5 array and cover all but the top row with your hand. Take two or three guesses at the total but don't confirm it — you want the idea 'equal rows might be multiplied, not counted' hanging in the air before you resolve it.

2. **Watch and Notice.** For 2×5 , count all ten squares aloud first, then reveal the multiplication so both routes reach the same answer — point across for the row, upward for the column. At 3×6 , ask 'would you rather count eighteen squares or say three sixes?' Say cm^2 every single time so the unit sticks.
3. **Try It Together.** The tool steps through all four rectangles in order, so no manual reset. Before each build, the whole class predicts the multiplication aloud; the board pupil then builds and confirms. Ask each time 'does rows-times-columns match the square count?' and listen for pupils muddling which number is rows and which is columns.
4. **Draw and Multiply in Your Copy.** Pupils draw a 5 cm by 3 cm rectangle on the squared page, count the squares, then write $5 \times 3 = 15 \text{ cm}^2$ underneath. Walk the room glancing for rectangles that sit on the grid lines and carry the cm^2 unit — nudge any one-by-one counters to check their count against the multiplication.
5. **Class Challenge.** Keep it brisk — predict, build, Check, confirm, move on. The 9×4 and 7×5 are the stretch: nudge strong pupils to reach for the times-table fact rather than counting. If the largest array crowds at IWB scale, draw it on squared paper alongside the tool so the rows-by-columns structure stays clear.
6. **What Did We Notice?.** Ask why multiplying rows by columns gives the same answer as counting every square. Revoice a strong answer: 'because every row has the same number of squares, so we can multiply instead of adding them one row at a time.' Head off any sense that the multiplication is a separate, different answer.

COMMON MISCONCEPTIONS

⚠ Pupils add the two side lengths instead of multiplying — for a 5 by 3 rectangle they write $5 + 3 = 8$ and call it the area.

Send them back to the squares. Have them physically count the 15 squares in the copybook rectangle, then ask 'does eight match what you counted?' Rebuild the rows on the IWB so they see three rows of five, not one row plus one column.

⚠ Pupils drop or muddle the unit — writing '15' or '15 cm' instead of 15 cm^2 .

Point to one single square on the grid and name it: 'this is one square centimetre'. The rectangle is fifteen of those, so it's cm^2 — square units for a covered surface, not the cm we use for a length.

⚠ Pupils swap which number is the rows and which is the columns and worry the answer is wrong when a neighbour wrote it the other way round.

Show 3×4 and 4×3 side by side on the tool — same total, same area. Revoice the turnaround: 'we get the same square count either way; the picture just turns on its side.'

DIFFERENTIATION

EMERGING

- Keep these pupils counting the squares one by one on the copybook rectangle first, then write the matching multiplication next to it — the count proves the fact.
- Stay with the smaller arrays (2×5 , 3×4) at the board while the class moves to the bigger facts; use square tiles laid in rows so the structure is physical, not just on screen.

DEVELOPING

- After the copybook 5×3 , ask them to draw a rectangle with an area of exactly 12 cm^2 and label its multiplication — more than one answer is possible.
- During Class Challenge, ask them to state the fact before the count and predict the answer for 9×4 without building it.

PROFICIENT

- Narrate a stretch variant at the board: 'find a rectangle whose area is 24 cm^2 — now find a different one with the same area. What changed?' Then pull them into the copybook to sketch both and label each multiplication.

➤ **Cross-curricular:** Tie to Geography — pupils sketch a rectangular field or GAA pitch on squared paper and work out its area in square units.

a) 18

b) 8

c) 14

Q1: 12 cm²

Q2: 20 cm²

Q3: 15 cm²

Q4: 36 cm²

Q5: 48 cm²

Q6: 35 cm²

Spot: Niamh added the rows and columns instead of multiplying. Area is rows $\times$ columns: $5 \times 3 = 15 \text{ cm}^2$.

EXTENSION SHEET · STRETCH ANSWERS

S1: 55 cm²

S2: 55 cm²

S3: 36 cm²

S4: 77 cm²

S5: 12 cm²

Investigation: Fence the biggest garden — open-ended; scan pupils' working for valid solution paths rather than a single answer.